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AVIATION AND AIR-POWER.

- (1) *Air-Power: Naval, Military, Commercial.* By C. Grahame-White and H. Harper. Pp. viii + 262. (London: Chapman and Hall, Ltd., 1917.) Price 7s. 6d. net.
- (2) *The Aviation Pocket-book for 1917: A Compendium of Modern Practice and a Collection of Useful Notes, Formulae, Rules, Tables, and Data Relating to Aeronautics.* By R. B. Matthews. Fifth edition. Pp. xix + 300. (London: Crosby Lockwood and Son, 1917.) Price 4s. 6d. net.
- (3) *The Properties of Aerofoils and Aerodynamic Bodies: A Text-book for Aeronautical Engineers, Draughtsmen, and Students.* By A. W. Judge. Pp. x + 298. (London: Whittaker and Co., 1917.) Price 15s. net.

(1) "AIR-POWER" is a non-technical survey of the position of aviation and its future, both in the military and civil senses. The book raises political as well as technical issues, and in the preface says that dominion of the air must mean ultimately the dominion of the world. Naturally enough, we find that Britain is to lead the world, but on the whole the book depends for its subject-matter on the ideas and propositions now well known in aeronautical technical circles, and the dominion looked for appears to be in the arts of peace rather than in those of war.

The book adds one more to the number of well-deserved tributes to the prowess of the British pilot during the war, and voices a fairly generally held opinion that natural aptitude for flying is a great and characteristic asset of the nation. It should not be forgotten that the war provides an outlet for sporting instincts which will be absent from the more humdrum work of the civil pilot, and the genius of the Germans for the organisation of humdrum labour should not be lost sight of in our efforts to avoid the suppression of individuality. The authors point out that in the present war the Germans reaped an initial advantage from the use of large numbers of mediocre aeroplanes, the organisation of the Allies for obtaining air supremacy being said to have been ineffective until the summer of 1916.

In future wars the authors foresee huge raiding expeditions by aeroplanes, the airship being heavily discounted by reason of its vulnerability to attack. On the other hand, aeroplanes are relatively safe from land-fire, although the proportion of machines brought down in this way is steadily increasing. During raids each bombing squadron is to be escorted by faster machines of a fighting class, whilst for long expeditions means will have to be discovered of keeping formation, the tendency being for units to separate and lose contact, thus rendering themselves more liable to attack from the opposing aircraft.

As a result of these bombing tactics we are to be driven underground. Arsenal, Govern-

ment buildings, and factories of national importance are all to hide their diminished heads.

It is to be hoped that the aeroplane will not be such a terrible weapon of offence as is portrayed by the writers of "Air-Power." Fortunately, the discussion of the technical details of the future aeroplane gives hope for a reasonably lengthy period in which to adjust ourselves to the new world that is to be.

The future aeroplane is to travel at 200, 250, or even 300 miles an hour, and to accomplish this with safety the area of the wings is to be variable to a great extent between high speed and cruising speed. They are to have petrol turbines instead of the present reciprocating engines; many of them may be used in one aeroplane, which will probably be a multiplane. There is to be a Transatlantic service doing the journey in forty-eight hours, and air travel is to be the ideal form of touring, because there will be no dust and no petrol fumes, apparently not even from the turbines. With such a machine it is surprising to find that the authors are doubtful of their pilots, and say that careless pilots must not on any account be allowed to take charge of machines, or the public might get timid.

The programme outlined is scarcely ever outside the bounds of possibility, but views on aviation will have changed greatly long before the programme is completed. If the authors do not convey their full enthusiasm to their readers, it is hoped that they are helping to make known the growing conviction that aeronautics is going to take a not unimportant place in the future history of the nation.

(2) Engineering pocket-books, no matter what the branch dealt with, must contain a certain amount of common matter, and in the case of the aviation pocket-book the formulæ for the strength of struts and beams and the permissible loading of ball-bearings are instances of this common ground. The specialised part of pocket-books comes from the standard text-books of the branch, and in aviation these books are still in the early stages of development. The formulæ and tables of the pocket-book are correspondingly meagre.

The aerodynamical information with which the book opens is correct enough, so far as it goes, but one may doubt its assistance to designers, who have much more recent and complete information at their disposal. On the subject of stability the book is very weak, and the brief note on lateral stability is valueless.

The author has given the method and formulæ used in the design offices when devising propellers, and as these are of a standard type the pocket-book will form a source of handy reference. It is probable that in the near future the theory will be extended, but not superseded. Engines are described mainly by the reproduction of the reports of trials, but some of the notes on tuning and engine faults are taken from the older subject of motoring, and should provide valuable assistance to those concerned in the use of aeronautical engines.

There are many other interesting features in the pocket-book, amongst which may be mentioned the tables of meteorological data, a description of compass errors and their elimination, scouting and signalling, a glossary of aeronautical terms, and a bibliography of aeronautics. The pocket-book makes a good beginning at collecting the skeleton tables and formulæ of the aeronautical industry, and may be expected to grow and keep pace with the text-books of the day.

(3) This book, one of a series of four contemplated by the author, consists of a collection of papers from various sources, of which the most prominent are the aerodynamical laboratories at the National Physical Laboratory and at Auteuil. The collection is uncritical, and in some cases the author is out of his depth. This is the case in the discussion of dynamical similarity, and more generally on all the theoretical topics dealt with in the book.

Aeronautics is still so new that work only three or four years old may need modification in the light of more recent experience before it can be used safely in a general scheme which includes this later work. It is the absence of these modifications which renders the book very little better than the original papers, and only so far as it leads to a wider distribution of knowledge has it any value.

The author limits the scope of his book to that part of aerodynamics which refers specifically to the performance of an aeroplane, and leaves to a separate volume the aerodynamical data which are concerned in the discussion of stability and control. It is clear that the author is handicapped by the restrictions which war places on publication, and considerable revision and addition may be expected at the end of hostilities.

THE GLASTONBURY LAKE VILLAGE.

The Glastonbury Lake Village: A Full Description of the Excavations and the Relics Discovered, 1892-1907. By A. Bulleld and H. St. George Gray. Vol. ii. Pp. xxxv-xl+353-724+plates lix-ci. (Glastonbury Antiquarian Society, 1917.) Price, 2 vols., 3l. 3s. net.

THIS volume completes the record of one of the most important excavations which have recently been carried out in this country. It falls into two parts: first, a descriptive catalogue of the objects discovered in the course of the excavation, prepared by a competent archæologist, Mr. St. George Gray, who was trained in the new school of archæological work under General Pitt Rivers, the pioneer in scientific processes of excavation; secondly, articles on plants, wild and cultivated, by Mr. Clement Reid; on the remains of birds, by Mr. C. W. Andrews; and an important series of papers by Prof. Boyd Dawkins on wild and domesticated animals, the inhabitants of the village, the range of the Iberic race in the prehistoric Iron age, and the place of that race in British ethnology.

The catalogue prepared by Mr. St. George Gray is a good piece of ethnographical work, each

specimen being carefully described with a lavish display of illustrations. Indeed, it is more than a mere catalogue; it might be better described as a handbook for the archæologist, because he not only describes the specimens with which he is dealing, but compares each article with similar objects found elsewhere, and gives careful references to a large number of papers in scientific journals. It might be worth considering whether this part of the book might be reprinted in a cheaper form for the use of field workers.

In order to complete the survey of this interesting site it may be hoped that the chance of recovering the village burial-ground will not be overlooked. In its absence some important questions must remain unanswered. In Britain during the prehistoric Iron age inhumation and cremation were both recognised methods for the disposal of the dead. This was probably the case in Glastonbury, and though a good deal of pottery has been recovered, it is as yet impossible to say how much of it may have been used for funerary purposes.

The valuable series of papers contributed by Prof. Boyd Dawkins enables us to understand the physical types of the people, their connection with other races, and in some measure, with the help of the articles found on the site, to reconstruct their local culture. From the sporadic distribution of the human bones, as well as their general isolation, he believes that we must suppose that a general massacre of the inhabitants occurred, and this conclusion is amply supported by marks of violence found on some of the skulls. Like their neighbours, they seem to have been subject to Belgic tribes which at the time of the Roman conquest had become the dominant power in southern Britain. The Lake-village was probably stormed and sacked by some Belgic tribesmen when they took possession of Somerset some time between Cæsar's invasion and the Claudian conquest. As M. Salomon Reinach has shown in the case of some of the Celts of Gaul, these Belgæ were possibly head hunters, and a weak settlement like this would be likely to provoke attack. In other places, like Wookey Hole and Worlebury, some survivors returned and reoccupied their houses. But at Glastonbury the whole population may have been wiped out or enslaved, and the site has remained uninhabited down to the present day. Possibly they were too weak to make effective resistance. The scarcity of weapons, even among people occupied in pastoral and industrial pursuits, is striking; out of 107 objects of iron, only seven could be classed in this category. At the same time, though sporadic fires used to occur, there seems to have been no general conflagration.

As regards the racial affinities of the inhabitants, they were members of the Iberic stock, the oldest element as yet traced in the existing European peoples. They were closely connected with their neighbours, the Silures, and probably they lost their Iberic tongue when they passed under the rule of the Goidels, and learned, in the Bronze age, to speak Gaelic. This Gaelic tongue was in its turn replaced by the Brythonic—Welsh,